



REPORT TO COUNCIL

City of Sacramento

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Staff
November 4, 2010

Honorable Mayor and
Members of the City Council

Title: Automated Meter Infrastructure (AMI) and Water Conservation

Location/Council District: Citywide

Recommendation: Receive and File

Contact: Michael Malone, Field Services Manager, 808-6226
Terrance Davis, Program Manager, 808-4929
Julie Friedman, Water Conservation Coordinator, 808-7898

Presenters: Terrance Davis, Program Manager

Department: Utilities

Division: Field Services

Organization No: 14001451

Description/Analysis

Issue: Staff is bringing forward a workshop on the Automated Meter Infrastructure (AMI) for discussion relative to current program deployment and water conservation benefits. With the implementation of AMI beginning in 2009, the Department of Utilities is progressing toward further reductions in future water demands. The AMI generated data provides the Department with the ability to enhance water conservation measures and discourage leaks.

Policy Considerations: Metered water service billing, in and of itself, provides customers with a financial incentive to avoid water waste. Indoor water conservation education will help the City manage its potable water supply in the short and long-term and help to reduce the effects of drought and water supply shortage within the City. Recent State legislation (SBX7 7) will require the City to achieve at least a 20% reduction in per capita water use by 2020.

Environmental Considerations:

California Environmental Quality Act (CEQA): The policy direction sought in this report does not constitute a “project” and, therefore, is exempt from CEQA review [CEQA Guidelines section 15378(b)(2)]. Moreover, reducing water waste and increasing water conservation through indoor water conservation regulations would not have any significant adverse environmental effects necessitating CEQA review [CEQA Guidelines Section 15061(b)(3)].

Sustainability Considerations: The implementation of AMI promotes sustainability by allowing the City to collect meter reads accurately and bill based on water consumption, thereby providing incentives for City customers to use water more efficiently. Additionally, the promotion of water conservation regulations is consistent with the Sustainability Master Plan goals of improving water conservation and water conservation awareness.

Commission/Committee Action: Not applicable

Rationale for Recommendation: AMI technology provides an opportunity for staff and customers to accurately account for water consumption and therefore serves as an excellent water conservation tool. Implementation of effective water conservation regulations and education will promote water efficiency and encourage the repair of indoor leaky or substandard fixtures.

Financial Considerations: None.

Emerging Small Business Development (ESBD): Not applicable as no goods or services will be purchased as a result of the proposed actions in this report.

Respectfully Submitted by:



Michael Malone
Manager, Field Services

Approved by:



Marty Hanneman
Director, Department of Utilities

Recommendation Approved:

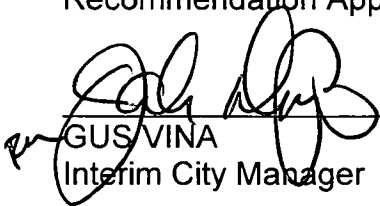

GUS VINA
Interim City Manager

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APPROVED AS TO FORM:


CITY ATTORNEY

BACKGROUND**Automated Meter Infrastructure (AMI) System**

On June 28, 2009, City Council approved Resolution 2009-501 authorizing the City Manager to sign agreements with Ferguson Waterworks and Datamatic, Ltd. to begin the implementation of the water meter reading automation system. The deployment of this system, also referenced as Automated Meter Infrastructure (AMI), allows the City to collect meter reads wirelessly through a radio signal. The system captures data for volumetric billing and additional consumption data including customer leaks, meter tampers and spikes in usage. Over time, the use of AMI-generated short interval data as a conservation tool will help enforce indoor water conservation regulations.

In October 2009, the City embarked on an ambitious project to deploy AMI technology to all new water meter installations and replacements. In addition, AMI installations have begun on the 32,000 existing drive-by Automated Meter Reading (AMR) devices currently in operation. In Fiscal Year (FY) 2010/11 the Department of Utilities plans to replace 9,000 existing drive-by units with AMI technology. In subsequent years an additional 5,000 replacements are planned for completion.

The full City-wide deployment of this technology will take several years to complete. However, the City is already taking advantage of the capabilities of this system in American Recovery and Reinvestment Act (ARRA) funded meter project areas and has installed the technology on 13,000 water service connections to date (as of October 2010). After the completion of thorough testing, 7,600 connections are currently in production, meaning that active data collection is occurring and being transmitted to the City's utility billing system. The remaining connections will be transitioned into production in phases upon the completion of full quality assurance testing.

Using a subset of 2,360 accounts as a pilot group, staff used AMI generated data and field investigations to identify customer- side leaks at 216 residences (9% of pilot accounts) located in Natomas and South Sacramento. The results of the pilot determined projected annual water losses at these 216 sites of 142,352 gallons per month. Attachment 3 shows the areas evaluated and provides additional detail of the estimated water losses.

Indoor Water Conservation Programs

As previously indicated, the AMI system includes several leak indicators that are triggered when predetermined thresholds of continuous water consumption are detected. Staff receive AMI email notifications of leak alarms and conduct field investigations to assess the validity of the leak. Upon the conclusion of the field investigation, tenants and/or property owners receive an informational letter (see Attachment 4) and a tip card offering an invitation for free water conservation services such as a Water Wise House Call (WWHC) and rebates for high efficiency toilets and washers.

Staff has also researched AMI and indoor water conservation policies of other agencies. A brief summary of these is provided in Attachment 2. The main elements of these policies are:

- Many agencies envision future potential of AMI given their declining water supply and they envision utilizing data to move toward proactive enforcement of water waste in the next one to two years. It was found that indoor water waste is not strictly enforced unless or until an agency has drought conditions. Many of the agencies researched use warnings and/or incentives (rebates) and are not bringing this to the penalty stage yet, but are planning to do so.
- Two of the surveyed agencies plan to have more aggressive enforcement with drought conditions. Currently, indoor leak repairs are voluntary.
- Some agencies viewed most internal leaks, under normal supply conditions, as an economic issue for the owner. They intended to use the AMR/AMI data for enforcing water waste if or when needed. Currently their rules are sufficient for enforcement of water waste supported by the data.
- Agencies are looking to improve leak detection, reduce lost water and manage rate structures that encourage conservation. They find they can work smarter and more efficiently with AMI while protecting clean drinking water. They find there are savings in production costs for the customer as well as for the agency. They can identify leaks before they become a significant issue for them and for the customer.

Attachment 2**Indoor Water Conservation, Cities in California and United States**

AMI technology is replacing the historical means of using the meter leak indicator with a “zero read test” where an on-site auditor would shut-off all water use and see if the meter was still running to indicate a leak (see Figure 1, below).



FIGURE 1. Manual Meter Read of Leak Indicator

With the capabilities of AMI with remote data collection and computer post-processing, staff now have a much more time efficient (and thus less costly) means to determine continual flow through a meter as a possible leak and target customers for a Water Wise House Call to help address their water waste.

A number of agencies are looking to reduce water waste and are investigating the use of AMI for leak detection on the customer side of the meter. A brief summary of some agencies with indoor conservation policies that are currently in place is provided in Table 1.

Table 1. Summary of Indoor Conservation Programs for Agencies with AMI

| City/Water Agency | Number of Metered Service Connections | Indoor Conservation Incentives¹ | Action for Indoor Leakage |
|---|--|---|---|
| City of Folsom, CA | 24,500 | Yes | None currently |
| East Bay Municipal Utility District (EBMUD), CA | 375,500 | Yes | Beta-testing; email notification to customers |
| Lake Arrowhead CSD, CA | 8,300 | Yes | Staff contact or written if not available |
| Cucamonga Valley Water District, CA | 49,000 | Yes | Email notification to customers |
| City of Sacramento, CA | 136,636 | Yes | Targeted customer notification |
| Las Vegas Valley Water District, NV | 360,000 | Yes | Targeted customer notifications from "Trickle Report" |
| Denver Water, CO | 303,900 | Yes | Targeted customer notifications |
| City of New York, NY | 830,000 | Yes | Future email notification to customers |

¹ Indoor conservation incentives programs such as rebates and water wise house calls

AMI Leak Investigation Pilot Results

Water Conservation Staff has completed a pilot investigation of a sample of 216 customer accounts in the Natomas Gateway West and the South Sacramento Valley Hi neighborhoods. Figure 1 shows the approximate locations of the sample project sites. The Summary Report, Leak Investigations in 2010 follows.

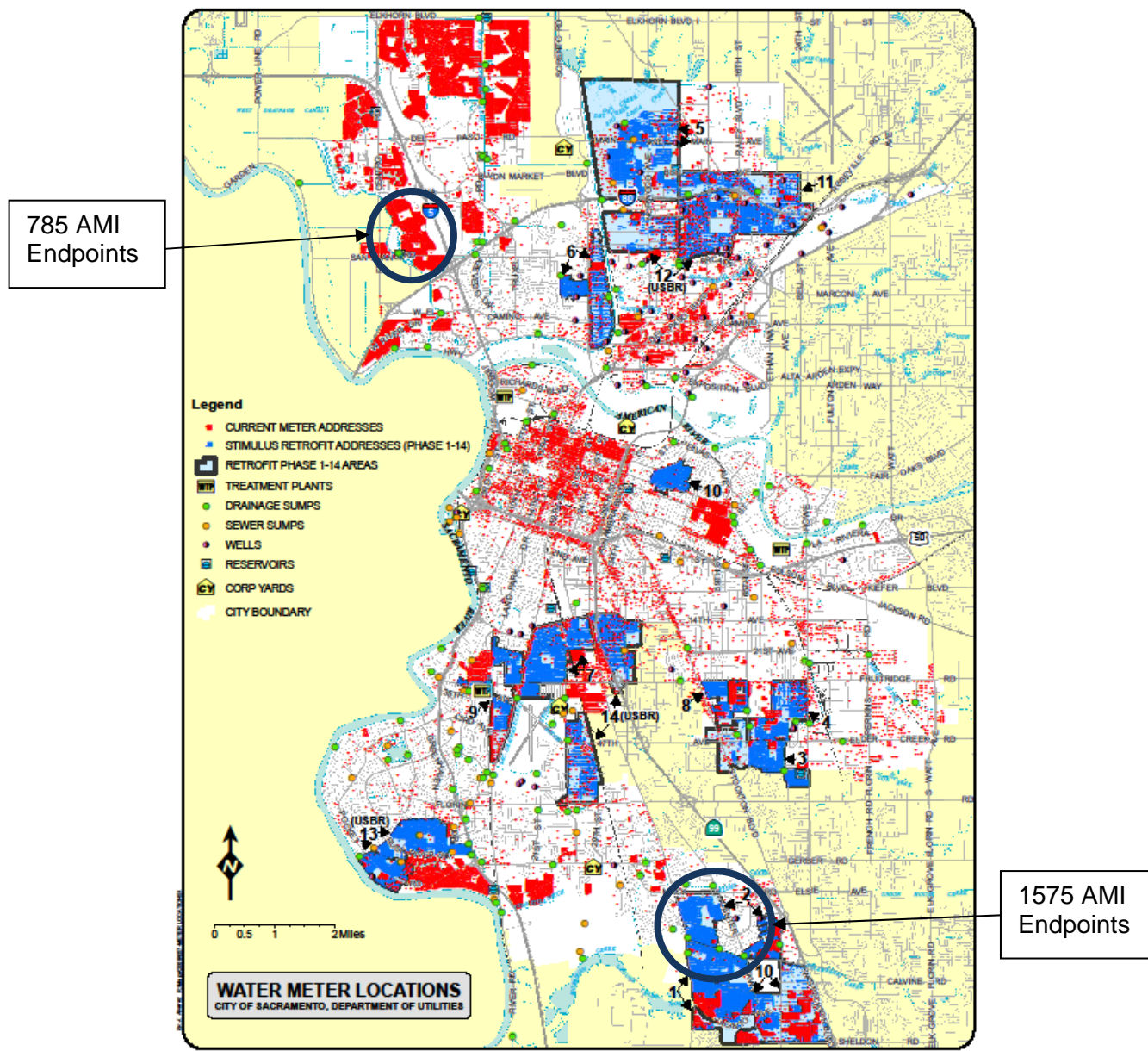


FIGURE 1. AMI Leak Investigation Pilot Locations

Summary Report, Leak Investigations in 2010

From AMI data, Water Conservation Specialists investigated irregular water usage for possible indoor or outdoor leaks at 19 Single Family Residential Homes (SFR's), one commercial site, and one multi-family apartment complex in North Natomas in January and February 2010. In May and June, 2010, 197 SFR's in South Sacramento were investigated. The tenants and property owners in these two areas received an informational letter and a tip card offering an invitation for free water conservation services such as a Water Wise House Call (WWHC) and rebates for high efficiency toilets and washers. Outdoor water waste issues were addressed with a Notice of Violation (NOV).

Information with door tags was left at the properties; however, some of the homes are rental property and needed information sent to the property owners. Since the initial pilot investigation in January, staff developed and sent a letter to the property owners, as well as leaving a door hanger and letter at the tenant's door about the unusual water usage and will see if this helps in aiding repairs (see Attachment 4).

Leak Investigation Results in Natomas, Gateway West (January, February 2010)

Of the 19 SFR's investigated, 14 (or 73%) were verified to have issues. The following describes the results of the field investigations:

- 16 SFR's (84%) were verified to have leaks – 3 SFR's had outdoor leaks (16%) and were issued a NOV.²
- One commercial site included a grocery store with regular water use because of a cooling tower and sprinkler system for the produce department.
- One apartment complex (241 units) indicated continual water use, but field investigations did not find leaks; further investigation is needed via Water Wise House Calls (WWHC's) for potential toilet leaks.
- Five WWHC's were conducted.

Estimate of Water Saved

Staff estimates a savings of approximately 4,400 aggregate gallons of water per day by addressing three verified irrigation leaks; 25 percent of customers investigated pursued a WWHC.

Estimate of Water Loss

Of the initial 19 SFR's identified for issues, 16 SFR's (84%) continued to indicate a leak in February, 2010. Water Conservation Staff estimated that approximately 10,000 aggregate gallons per day was being lost.

² Determination of indoor leak made by visual inspection and isolation of the house valve to check if meter stopped registering

Leak Investigation Results in South Sacramento, Valley Hi (May, June 2010)

Of the 197 SFR's investigated, 140 (or 71%) were verified to have issues. The following describes the results of the field investigations:

- 57 SFR's (30%) did not indicate a leak.
- 140 SFR's (70%) were verified to have leaks - 12 SFR's (9%) had outdoor leaks and were issued a NOV.
- 6 WWHC's were provided.

Estimate of Water Saved

Staff estimates a savings of 13,000 aggregate gallons of water per day by providing WWHC's for addressing leaks; nine percent of customers investigated pursued a WWHC.

Estimate of Water Loss

Water Conservation Staff estimated that approximately 29,000 aggregate gallons per day was potentially lost during the May-June, 2010 investigation, at a cost of \$750 per month.

Of the initial 197 SFR's identified for issues, one-third of the homes (65 SFR's or 33%) continued to indicate a leak in July, 2010. Even with the WWHC's offered and the information left at the door, it is still up to the resident or business owner to either repair the "leak" or notify property owners or management to repair the issue.

City Customer Leak Investigation Letter

Attachment 4



DEPARTMENT OF UTILITIES
WATER CONSERVATION

CITY OF SACRAMENTO
CALIFORNIA

2260 GLEN ELLEN CIRCLE
SACRAMENTO, CA
95822-3634

PH 916-264-5011
FAX 916-808-5655

Date: _____

Dear Customer:

The Department of Utilities automated water meter read system indicated irregular water use at _____. Following a visual inspection of the water meter servicing the property by a Water Conservation Inspector, an approximate water loss of _____ gallons per day has been estimated.

Irregular use is often an indication of an indoor leak (such as a possible leaky toilet) or outdoor irrigation system leak (such as a leaky valve). We would like to assist you further in identifying the reason for the irregular water usage and recommend that you call us to schedule a free Water Wise House Call. Once the free house call is scheduled, a Water Conservation Inspector will visit your home or business bringing water-efficient products, tools and information to help evaluate your system and water use. Recommendations for using water wisely, indoors and out, will also be provided.

The following table provides a conversion of gallons to cubic feet for the estimated water loss, based upon the irregular use:

| Gallons/Day Loss | Gallons/Month Loss | Cubic Foot (CF) conversion (gallons divided by 7.48 equals CF) |
|-------------------------|---------------------------|--|
| 100 | 3,100 | 414.438 |
| 250 | 7,750 | 1036.096 |
| 400 | 12,400 | 1657.754 |

We are here to assist you in identifying ways to save money by saving water. To schedule a free water wise house call appointment, please call 311 or 916-264-5011.

Sincerely,

Water Conservation Office

Attachment 5

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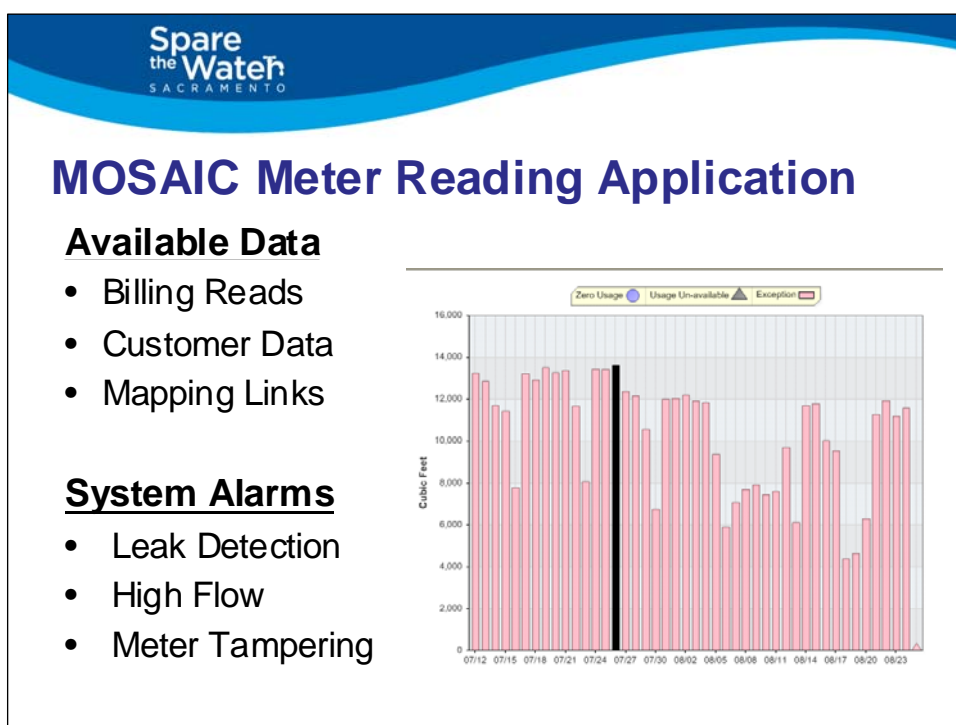
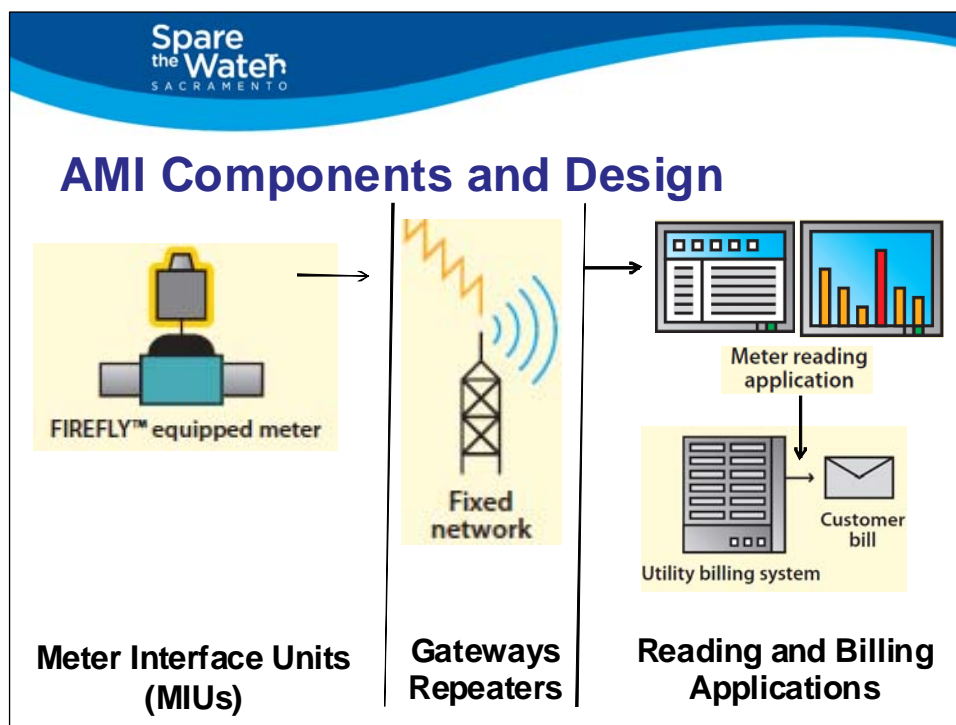
Outline

- Overview of Automated Meter Infrastructure (AMI)
- Update on AMI Implementation Status
- Water Conservation Benefits
- Questions



Automated Meter Infrastructure (AMI) Project Background

- Program was approved by City Council on July 28, 2009
- City evaluated multiple options and purchased a mesh fixed network solution
- AMI enhances operational efficiency by eliminating manual and drive-by read collection systems



Spare the Water
SACRAMENTO

MOSAIC Meter Reading Application

Reading Report | Meter Detail | Profile Graph | Graph Options

Account#: Cycle/Route: **11/041** ☒ Un-Read Meters
 Name: Start: 08/22/10 ☒ Audit Failures
 Meter ID: End: 08/25/10 ☒ Trouble Codes
 Address:
 Current Gateway: ☒ Associated Only
 FF SN: ☐ Un-Exported / Un-Transferred Only ☐ Global Search

Service Type:

Report Total: 785 Save As: [CSV](#) | [XLS](#) | [PDF](#)

| Cycle | Route | Account# | Name | Sac Type | Meter ID | FF SN | Seq # | Address | Read Date | Read | Fail-Audit Amount | Trouble Code | Export Date | Transfer Date |
|-------|-------|----------|------|----------|----------|-------|-------|---------|----------------------|----------|-------------------|--------------|-------------|---------------|
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 1255120 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 292514 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 1052980 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 2558035 | - | LEAK | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 3062730 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 16869480 | - | LEAK | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 1490150 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 386691 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 187161 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 292445 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 335637 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 105886 | - | | | |
| 11 | 041 | | | | | | | | 8/25/2010 1:00:00 AM | 208722 | - | | | |

Reading Application
Sample Consumption Data

Leak Indicator

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Current AMI Project Implementation

- American Recovery and Reinvestment Act funding accelerated implementation
- 13,000 meter interface units (MIUs) have been installed (as of October 2010)
- 9,000 additional MIUs scheduled for installation by April 2011
- 9,000 MIUs planned for FY11/12 installation as replacements and new meter retrofits



Leak Detection Pilot Results

- **2,360 AMI installations reviewed Dec to June 2010**
 - 216 (9%) single family residences exhibited leak alarms (24 hours of continuous consumption)
 - Aggregate water loss for 216 leaks projected at 142,352 gallons per month
 - Staff conducted field investigations to verify leaks and sent letters to customers to offer water conservation services
 - As of July 2010, 35% of leak alarms remained



Water Conservation Benefits

- **Improve Leak Detection**
 - Manage before significant issue, reduce lost water
- **Enforce Water Waste**
 - Provides an additional tool for enforcement of City code
- **Improve Customer Water Efficiency**
 - In the future customers will be able to monitor daily consumption via website

